Exhibit 4

EXHIBIT 4

CYWEE GROUP LTD,
vs.
HUAWEI DEVICE CO. LTD.,
HUAWEI DEVICE (DONGGUAN) CO. LTD., AND
HUAWEI DEVICE USA, INC.

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

EXEMPLARY CLAIM CHART

U.S. PATENT NO. 8,441,438 – Huawei Nexus 6P
Infringement Contentions

These contentions are disclosed to only provide notice of Plaintiff's theories of infringement. These contentions do not constitute proof nor do they marshal Plaintiff's evidence of infringement to be presented during trial.

Claim 1

Claim 1, with claim constructions, is recited below (text in brackets [] reflects the Court's claim construction or the parties' agreed claim construction in *CyWee Group, Ltd. v. Apple Inc.*, No. 3:13-cv-01853-HSG). Construed terms and constructions are underlined.

1. A three-dimensional (3D) pointing device subject to movements and rotations in dynamic environments, comprising:

a housing associated with said movements and rotations of the 3D pointing device in a spatial pointer reference frame;

a printed circuit board (PCB) enclosed by the housing;

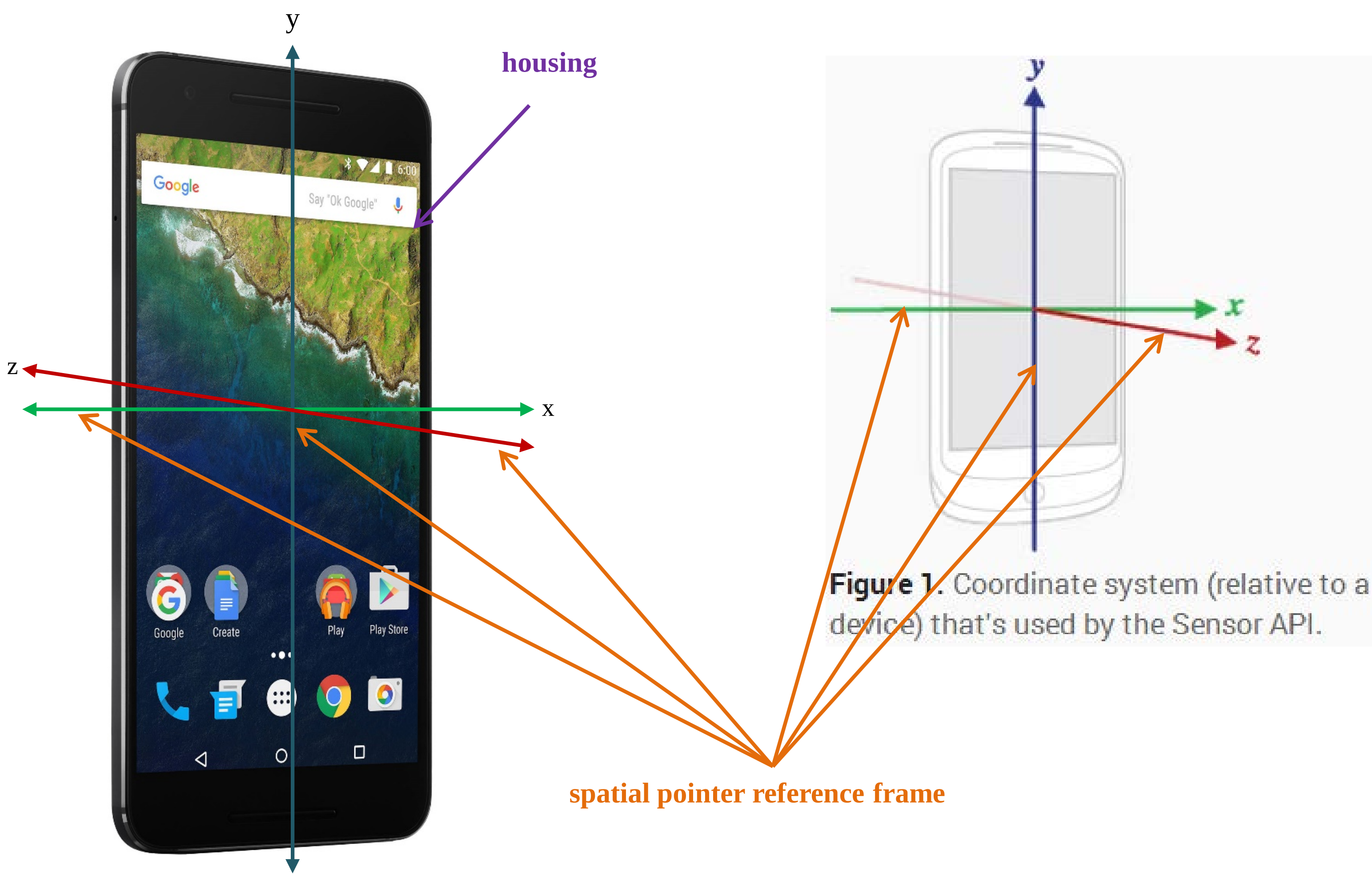
a six-axis motion sensor module attached to the PCB, comprising a rotation sensor for detecting and generating a first signal set comprising angular velocities ω_x, ω_y, ω_z associated with said movements and rotations of the 3D pointing device in the spatial pointer reference frame, an accelerometer for detecting and generating a second signal set comprising axial accelerations A_x, A_y, A_z associated with said movements and rotations of the 3D pointing device in the spatial pointer reference frame; and

a processing and transmitting module, comprising a data transmitting unit electrically connected to the six-axis motion sensor module for transmitting said first and second signal sets thereof and a computing processor for <u>receiving and calculating said first and second signal sets from the data transmitting unit [Court's construction: no construction necessary]</u>, communicating with the six-axis motion sensor module to calculate a resulting deviation comprising resultant angles in said spatial pointer reference frame by <u>utilizing a comparison to compare the first signal set with the second signal set [Court's construction: using the calculation of actual deviation angles to compare the first signal set with the second signal set]</u> whereby said resultant angles in the spatial pointer reference frame of the resulting deviation of the six-axis motion sensor module of the 3D pointing device are obtained under said dynamic environments, wherein the comparison utilized by the processing and transmitting module further comprises an update program to obtain an updated state based on a previous state associated with said first signal set and a measured state associated with said second signal set; wherein the measured state includes a measurement of said second signal set and a predicted measurement obtained based on the first signal set without using any derivatives of the first signal set.

Claim 1
A three-dimensional (3D) pointing device subject to movements and rotations in dynamic environments, comprising:

Huawei Nexus 6P

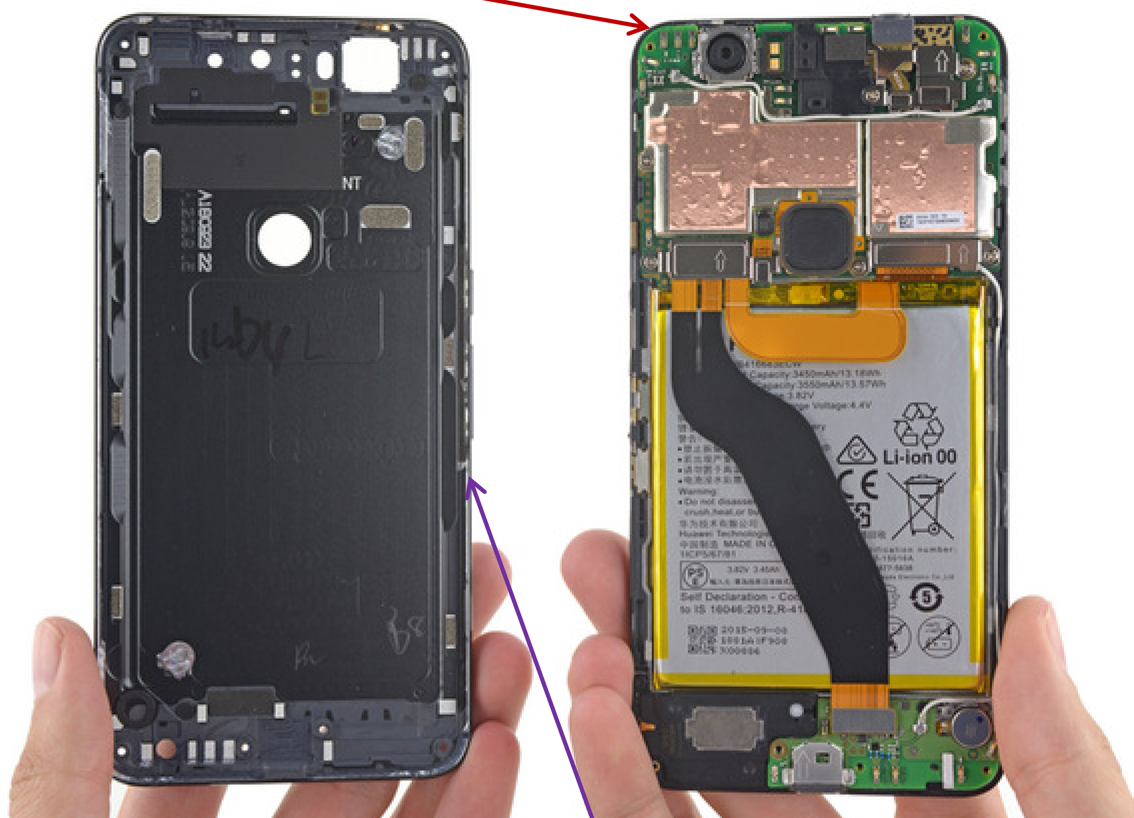
Claim 1
a **housing** associated with said movements and rotations of the 3D pointing device in a **spatial pointer reference frame**;



Source: http://developer.android.com/guide/topics/sensors/sensors_overview.html#sensors-coords

Claim 1
a **printed circuit board (PCB)** enclosed by the **housing**;

printed circuit board (PCB)



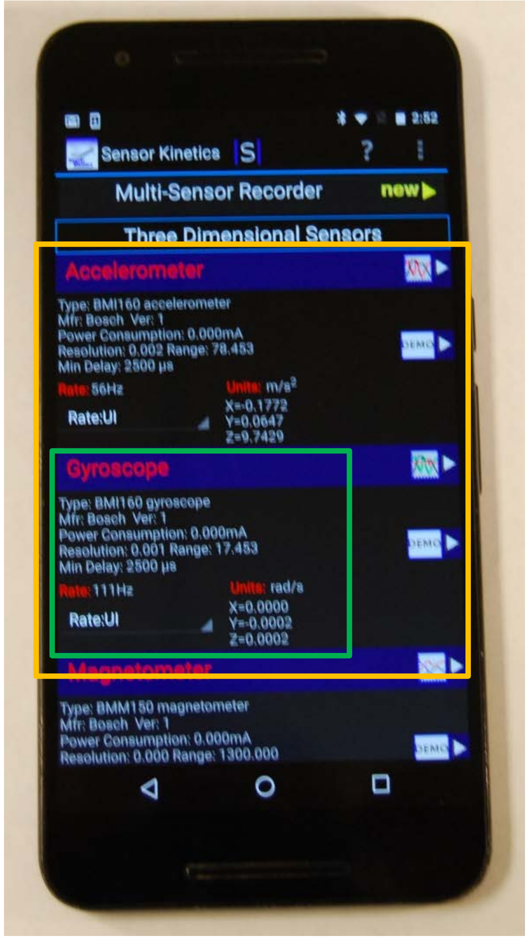
housing

Source: https://d3nevzfk7ii3be.cloudfront.net/igi/ZlpUoq3OjhHJsqTo.medium

Claim 1

a **six-axis motion sensor module** attached to the PCB, comprising a **rotation sensor** for detecting and generating a **first signal set** comprising angular velocities ω_x, ω_y, ω_z associated with said movements and rotations of the 3D pointing device in the spatial pointer reference frame,

The **six-axis motion sensor module** includes an accelerometer and gyroscope combo. The **rotation sensor** is the Gyroscope included in the **six-axis motion sensor module**.

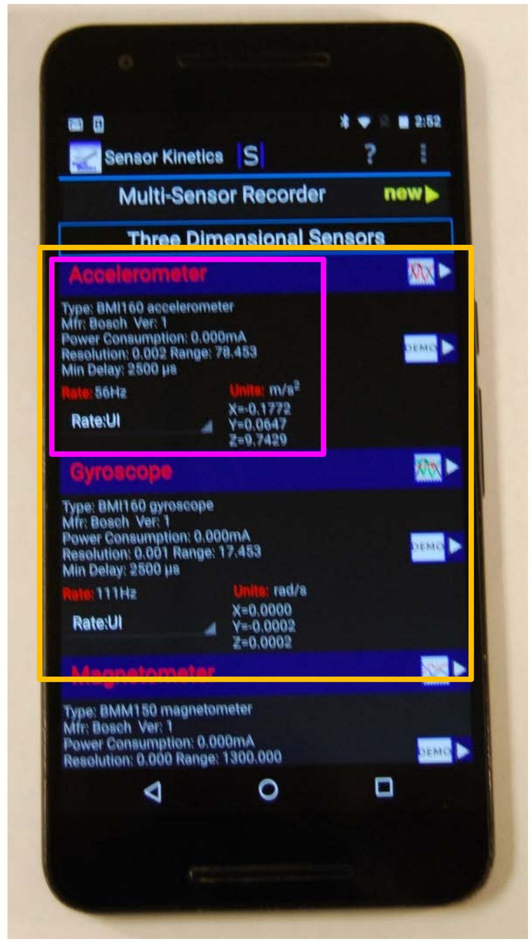


Claim 1
a six-axis motion sensor module attached to the PCB, comprising a rotation sensor for detecting and generating a first signal set comprising angular velocities ω_x, ω_y, ω_z associated with said movements and rotations of the 3D pointing device in the spatial pointer reference frame,
See additional support for this element in Exhibit 1

Claim 1

a **six-axis motion sensor module** attached to the PCB, comprising…an **accelerometer** for detecting and generating a **second signal set** comprising axial accelerations Ax, Ay, Az associated with said movements and rotations of the 3D pointing device in the spatial reference frame; and

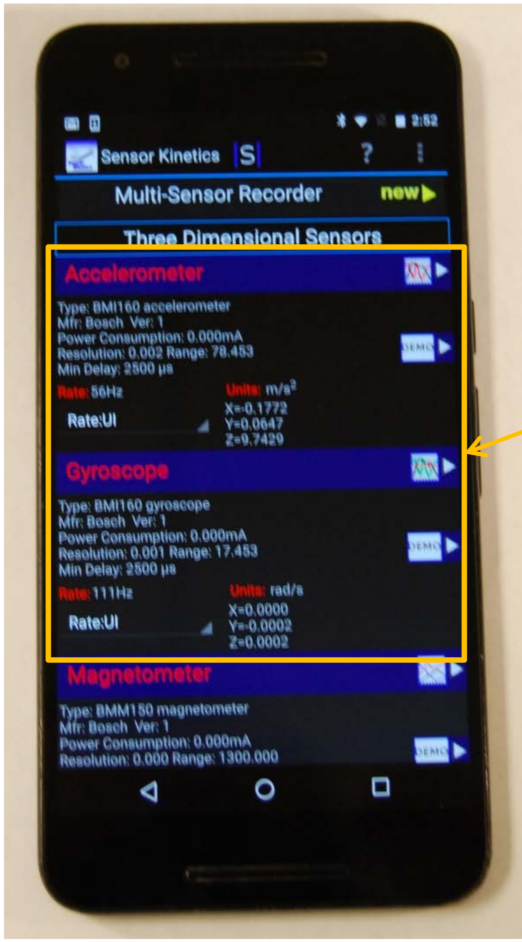
The **six-axis motion sensor module** is an **accelerometer** and gyroscope combo.



Claim 1
a six-axis motion sensor module attached to the PCB, comprising…an accelerometer for detecting and generating a second signal set comprising axial accelerations Ax, Ay, Az associated with said movements and rotations of the 3D pointing device in the spatial reference frame; and
See additional support for this element in Exhibit 1

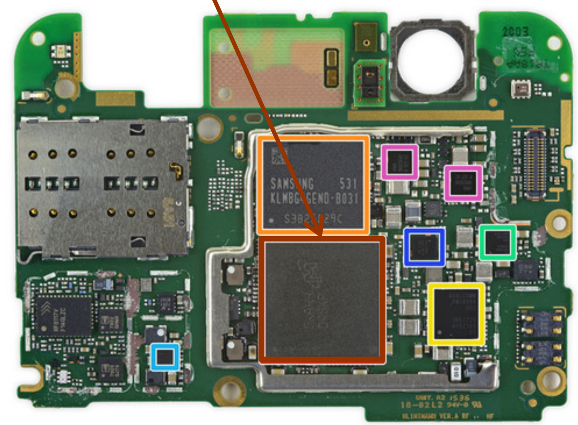
Claim 1

a processing and transmitting module, comprising a data transmitting unit electrically connected to the **six-axis motion sensor module** for transmitting said first and second signal sets thereof and a **computing processor** for receiving and calculating said first and second signal sets from the data transmitting unit,



six-axis motion sensor module

computing processor



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Claim 1

communicating with the six-axis motion sensor module to calculate a resulting deviation comprising resultant angles in said spatial pointer reference frame by <u>utilizing a comparison to compare the first signal set with the second signal set [Court's Construction: using the calculation of actual deviation angles to compare the first signal set with the second signal set]</u> whereby said resultant angles in the spatial pointer reference frame of the resulting deviation of the six-axis motion sensor module of the 3D pointing device are obtained under said dynamic environments,

See additional support for this element in Exhibit 1

Claim 1
wherein the comparison utilized by the processing and transmitting module further comprises an update program to obtain an updated state based on a previous state associated with said first signal set and a measured state associated with said second signal set;
See additional support for this element in Exhibit 1

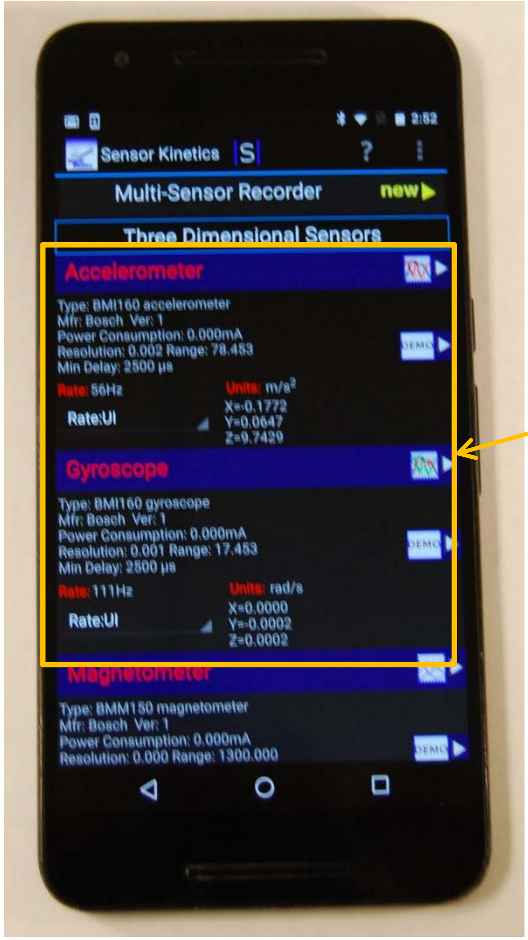
Claim 1
wherein the measured state includes a measurement of said second signal set and a predicted measurement obtained based on the first signal set without using any derivatives of the first signal set.
See additional support for this element in Exhibit 1

Claim 4
The 3D pointing device of claim 1, wherein the spatial pointer reference frame is a reference frame in three dimensions; and wherein said resultant angles of the resulting deviation includes yaw, pitch and roll angles about each of three orthogonal coordinate axes of the spatial pointer reference frame.
See additional support for this element in Exhibit 1

Claim 5

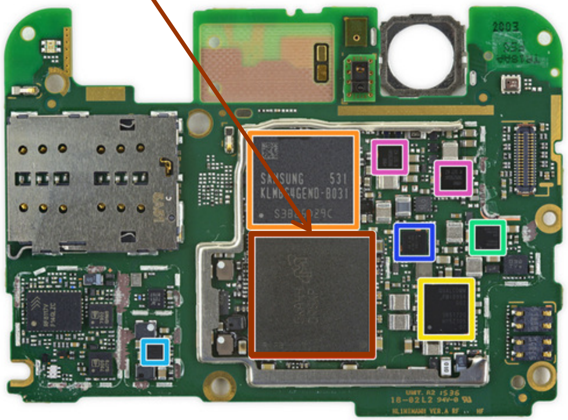
The 3D pointing device of claim 1, wherein the **data transmitting unit** of the processing and transmitting module is attached to the PCB enclosed by the housing and transmits said first and second signal of the **six-axis motion sensor module** to the **computer processor** via electronic connections.

The **computer processor** and the **six-axis motion sensor module** are each attached to the PCB, as is the **data transmitting unit**, which transmits the first and second signal of the **six-axis motion sensor module** to the **computer processor** via electronic connections.



six-axis motion sensor module

computing processor



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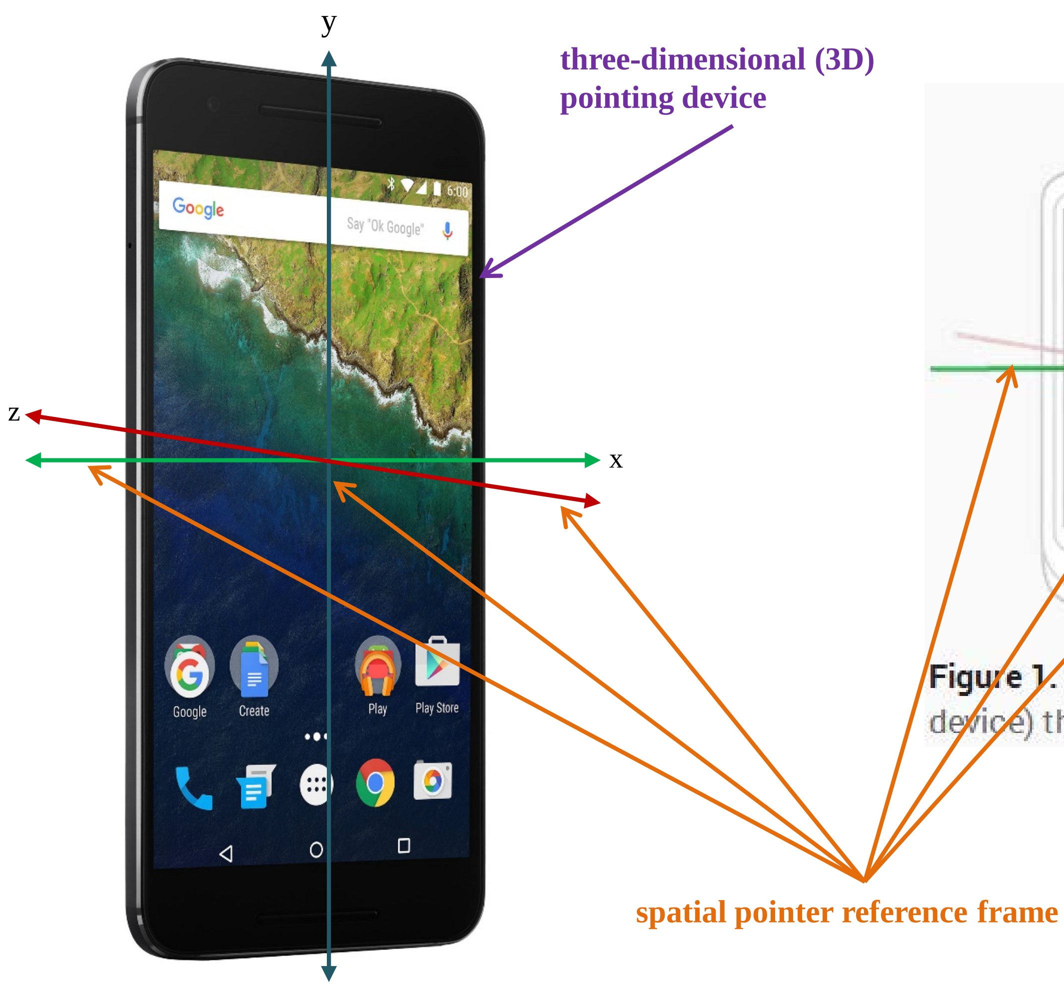
Claim 14

A method for obtaining a resulting deviation including resultant angles in a spatial pointer reference frame of a three-dimensional (3D) pointing device utilizing a six-axis motion sensor module therein and subject to movements and rotations in dynamic environments in said spatial pointer reference frame, comprising the steps of:



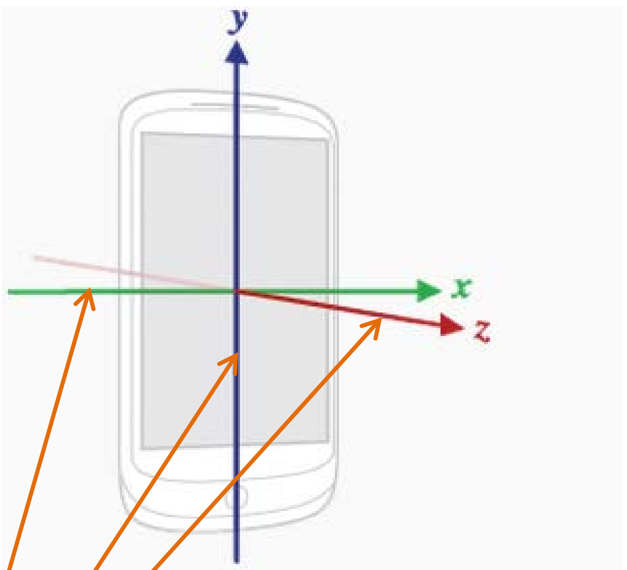


Figure 1. Coordinate system (relative to a device) that's used by the Sensor API.

Source: http://developer.android.com/guide/topics/sensors/sensors_overview.html#sensors-coords

Claim 14
obtaining a previous state of the six-axis motion sensor module; wherein the previous state includes an initial-value set associated with previous angular velocities gained from the motion sensor signals of the six-axis motion sensor module at a previous time T−1;
See additional support for this element in Exhibit 1

Claim 14
obtaining a current state of the six-axis motion sensor module by obtaining measured angular velocities ω_x, ω_y, ω_z gained from the motion sensor signals of the six-axis motion sensor module at a current time T;
See additional support for this element in Exhibit 1

Claim 14

obtaining a measured state of the six-axis motion sensor module by obtaining measured axial accelerations Ax, Ay, Az gained from the motion sensor signals of the six-axis motion sensor module at the current time T and calculating predicted axial accelerations Ax′, Ay′, Az′ based on the measured angular velocities ω_x, ω_y, ω_z of the current state of the six-axis motion sensor module without using any derivatives of the measured angular velocities ωx, ωy, ωz;

See additional support for this element in Exhibit 1

Claim 14
said current state of the six-axis motion sensor module is a second quaternion with respect to said current time T;
See additional support for this element in Exhibit 1

Claim 14

comparing the second quaternion in relation to the measured angular velocities ω_x, ω_y, ω_z of the current state at current time T with the measured axial accelerations Ax, Ay, Az and the predicted axial accelerations Ax′, Ay′, Az′ also at current time T; obtaining an updated state of the six-axis motion sensor module by comparing the current state with the measured state of the six-axis motion sensor module; and

See additional support for this element in Exhibit 1

Claim 14
calculating and converting the updated state of the six axis motion sensor module to said resulting deviation comprising said resultant angles in said spatial pointer reference frame of the 3D pointing device.
See additional support for this element in Exhibit 1

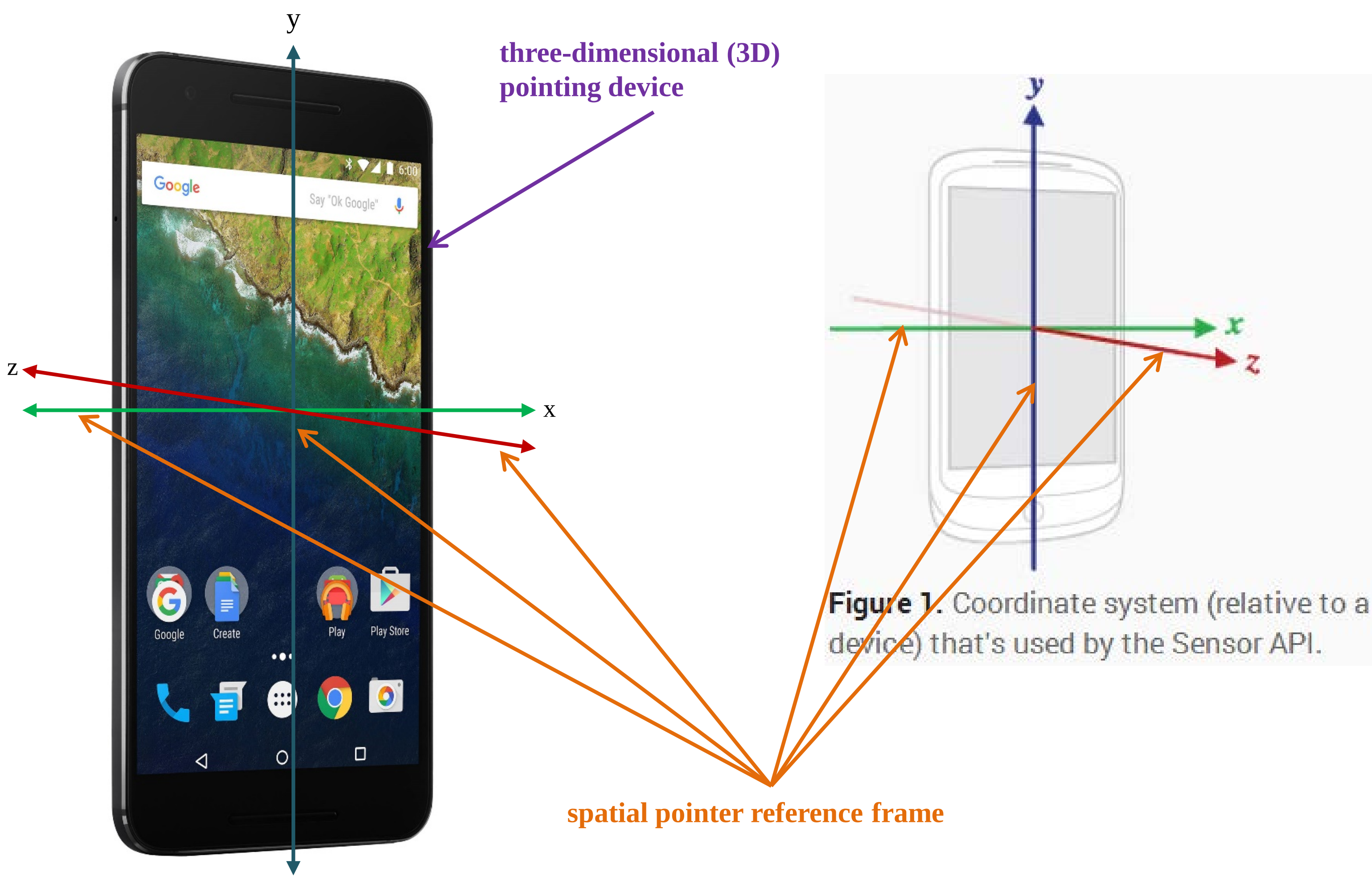
Claim 15
The method for obtaining a resulting deviation of a 3D pointing device of claim 14, further comprises the step of outputting the updated state of the six-axis motion sensor module to the previous state of the six-axis motion sensor module; and wherein said resultant angles of the resulting deviation includes yaw, pitch and roll angles about each of three orthogonal coordinate axes of the spatial pointer reference frame.
See additional support for this element in Exhibit 1

Claim 16
The method for obtaining a resulting deviation of a 3D pointing device of claim 14, wherein said previous state of the six-axis motion sensor module is a first quaternion with respect to said previous time T−1; and said updated state of the six-axis motion sensor module is a third quaternion with respect to said current time T.
See additional support for this element in Exhibit 1

Claim 17
The method for obtaining a resulting deviation of 3D pointing device of claim 14, wherein the obtaining of said previous state of the six-axis motion sensor module further comprises initializing said initial-value set.
See additional support for this element in Exhibit 1

Claim 19

A method for obtaining a resulting deviation including resultant angles in a **spatial pointer reference frame** of a **three-dimensional (3D) pointing device** utilizing a six-axis motion sensor module therein and subject to movements and rotations in dynamic environments in said **spatial pointer reference frame**, comprising the steps of:



Source: http://developer.android.com/guide/topics/sensors/sensors_overview.html#sensors-coords

Claim 19
obtaining a previous state of the six-axis motion sensor module; wherein the previous state includes an initial-value set associated with previous angular velocities gained from the motion sensor signals of the six-axis motion sensor module at a previous time T−1;
See additional support for this element in Exhibit 1

Claim 19

obtaining a current state of the six-axis motion sensor module by obtaining measured angular velocities ω_x, ω_y, ω_z gained from the motion sensor signals of the six-axis motion sensor module at a current time T;

See additional support for this element in Exhibit 1

Claim 19

obtaining a measured state of the six-axis motion sensor module by obtaining measured axial accelerations Ax, Ay, Az gained from the motion sensor signals of the six-axis motion sensor module at the current time T and calculating predicted axial accelerations Ax′, Ay′, Az′ based on the measured angular velocities ω_x, ω_y, ω_z of the current state of the six-axis motion sensor module without using any derivatives of the measured angular velocities ωx, ωy, ωz;

See additional support for this element in Exhibit 1

Claim 19
said current state of the six-axis motion sensor module is a second quaternion with respect to said current time T;
See additional support for this element in Exhibit 1

Claim 19

comparing the second quaternion in relation to the measured angular velocities ω_x, ω_y, ω_z of the current state at current time T with the measured axial accelerations Ax, Ay, Az and the predicted axial accelerations Ax′, Ay′, Az′ also at current time T; obtaining an updated state of the six-axis motion sensor module by comparing the current state with the measured state of the six-axis motion sensor module; and

See additional support for this element in Exhibit 1

Claim 19
calculating and converting the updated state of the six axis motion sensor module to said resulting deviation comprising said resultant angles in said spatial pointer reference frame of the 3D pointing device.
See additional support for this element in Exhibit 1